UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/586,317 | 07/14/2006 | Takafumi Koshinaka | Y0647.0161 | 2564 |

32172 7590 04/23/2008

DICKSTEIN SHAPIRO LLP
1177 AVENUE OF THE AMERICAS (6TH AVENUE)
NEW YORK, NY 10036-2714

| EXAMINER | |
|---|---|
| BORSETTI, GREG | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 4141 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 04/23/2008 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/586,317 | KOSHINAKA, TAKAFUMI | |
| | Examiner | Art Unit | |
| | GREG A. BORSETTI | 4141 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *14 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/14/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. Claims 1-20 are pending.

### *Information Disclosure Statement*

2. The Information Disclosure Statement (IDS) submitted on 7/14/2006 is not in compliance with the provisions of 37 CFR 1.97.

- All NPL documents provided from the "Foundation of Sound Recognition (2nd volume) give no indication of the associated author as a part of the translation to make it understandable to the examiner.
- The NPL document "Applied Mathematics ..." gives no indication of the associated author as a part of the translation to make it understandable to the examiner.
- The NPL document "Hidden Markov Model ... " by Yamron et al. was not provided by applicant. Furthermore, no date was provided on the IDS.

### *Drawings*

3. The drawings filed on 7/14/2006 are accepted by the examiner.

### *Specification*

4. The abstract of the disclosure is objected to because the abstract cannot exceed 150 words in length and/or 15 lines of text. Furthermore, References to other parts of the application should not be included in the Abstract. "The sheet or sheets presenting

the abstract may not include other parts of the application or other material. (C. Language and Format)" Correction is required. See MPEP § 608.01(b).

### *Claim Rejections - 35 USC § 101*

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 10 of the claimed invention is directed to non-statutory subject matter. Claim 10 specifically states that the claim refers to a computer program, which is non-statutory under 35 U.S.C. 101. Claim 10 is rejected as a program per se.

### *Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 5, 6, 10-12, 14, 16, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Kanevsky et al. (US Patent #6104989).

**As per claim 1, Kanevsky discloses:**

- **generating a probability model in which information indicating which word of a text document belongs to which topic is made to correspond to a latent variable and each word of the text document is made to correspond to an observable variable**
- [Kanevsky, column 2, lines 25-28] discloses "The present invention implements a content-based approach that exploits the analogy to speech recognition, allowing segmentation to be treated as a Hidden Markov Model (HMM) process." [Kanevsky, column 2, lines 45-53] further discloses "Changes in topic are detected by successively looking backward from a current word, one additional word at a time, to a prior word, determining for each step in succession whether a comparative topic change metric is greater than a topic change threshold ratio***. The metric includes some likelihood measure that a word string extending from the current word to the prior word will be found in a context of a topic in the battery***, not including the neutral topic." Each word in the document is made to correspond to some kind relationship to corresponding words which teaches the observable variable. The latent variable is that the word itself is not identifiable to a topic without its surrounding words.
- **outputting an initial value of a model parameter which defines the generated probability model**

- [Kanevsky, column 5, lines 1-2] discloses "If a conclusion is reached that a current topic is not in the list, declare T as the current topic." T has been established as a neutral topic wherein it describes a general distribution and initial value of a model parameter for when a topic cannot be found in the battery. [Kanevsky, column 4, lines 13-19] It defines the generated probability model because it establishes a generality that can be further defined while also retaining its location with respect to its detected applicable words.

- **estimating a model parameter corresponding to a text document as a processing target on the basis of the output initial value of the model parameter and the text document**

- [Kanevsky, column 4-5, lines 57-67, 1-5] discloses that a maximum likelihood is calculated for the topic that is applicable to the text. "If a conclusion is reached that a topic is not in the list, declare T the current topic." T is used to preserve space for further processing. The topics are estimated corresponding to a text document based on the battery, but also on if the neutral topic is used.

- **segmenting the text document as the processing target for each topic on the basis of the estimated model parameter**

- [Kavensky, column 8-9, lines 65-67, 1-8] discloses "A block 400 contains a text that should be translated. This text is segmented (404) with topic onsets and labeled with topics in a block 401 using likelihood ratios 403 as in explanations in FIG. 4 While text data is accumulated to proceed with topic identification of a

segment it is stored in the buffer 402." The segmentation occurs as a result of the likelihood ratios and the topic labeling.

**As per claim 3, claim 1 is incorporated and Kanevsky discloses:**

**- a probability model is a hidden Markov model**

- [Kanevsky, column 2, lines 25-28] discloses "The present invention implements a content-based approach that exploits the analogy to speech recognition, allowing segmentation to be treated as a Hidden Markov Model (HMM) process."

**As per claim 5, claim 3 is incorporated and Kanevsky discloses:**

**- the hidden Markov model is of a discrete output type**

- [Kavensky, column 8-9, lines 65-67, 1-8] discloses " A block 400 contains a text that should be translated. This text is segmented (404) with topic onsets and labeled with topics in a block 401 using likelihood ratios 403 as in explanations in FIG. 1 While text data is accumulated to proceed with topic identification of a segment it is stored in the buffer 402. After a topic of the current segment was established a text segment from a buffer is sent to 405 for translation. A machine 405 performs translation on each homogenous segment using different language models that were trained for each topic. An output of the machine 405 is a translated text 406." The HMM model responsible for segmenting the text prepares the text for translation which would inherently be

output in a segmented discrete output type to a sequence of words from the initial string.

**As per claim 6, claim 1 is incorporated and Kanevsky discloses:**

- **the step of estimating a model parameter comprises the step of estimating a model parameter by using one of maximum likelihood estimation and maximum a posteriori estimation**
- [Kanevsky, column 4-5, lines 57-67, 1-5] discloses that a maximum likelihood is calculated for the topic that is applicable to the text. "If a conclusion is reached that a topic is not in the list, declare T the current topic." T is used to preserve space for further processing. The topics are estimated corresponding to a text document based on the battery, but also on if the neutral topic is used.

Claims 10 and 11 are rejected under the same principles as claim 1 for having parallel limitations.

Claims 12, 14, 16, and 17 are rejected under the same principles for being the apparatus claims to the corresponding method claims 1, 3, 5, and 6. Each of the stated corresponding claims have parallel limitations between the method and the device and the hardware aspect of claims 12, 14, 16, and 17 are taught by [Kanevsky, claims 13-24] which define the apparatus directed to the previous method claims for practicing the invention.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanevsky et al. (US Patent #6104989).

**As per claim 4, claim 3 is incorporated and Kanevsky fails to fully teach:**

**- the hidden Markov model has a unidirectional structure**

- Kanevsky teaches a real-time system where it would be obvious to someone of ordinary skill in the art that a left-to-right hidden Markov model would be used because time only flows from left-to-right and not vice versa.

Claim 15 is rejected under the same principles for being the apparatus claims to the corresponding method claims 4. Each of the stated corresponding claims have parallel limitations between the method and the device and the hardware aspect of claim 15 is taught by [Kanevsky, claims 13-24] which define the apparatus directed to the previous method claims for practicing the invention.

9. Claims 2, 9, 13, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanevsky et al. (US Patent #6104989) in view of NPL document "A tutorial on Hidden Markov Models and Selected Application in Speech Recognition" hereinafter Rabiner.

**As per claim 2, claim 1 is incorporated and Kanevsky teaches:**

**- the generation of a probability model**

**- the step of outputting an initial value of a model parameter for the probability model**

**- estimating a model parameter for the probability model**

- Kanevsky shows these limitations in the rejection of claim 1 above

**Kanevsky fails to teach,**

**- multiple probability models**

**Rabiner, in analogous art, teaches the above limitation,**

- [Rabiner, page 10] discloses multiple HMM models which are applicable to the HMM used in Kanevsky. It would be obvious to someone of ordinary skill in the art that multiple models could be developed around the number of states or form of the HMM models to characterize them differently. Upon use, one will perform the best, so it would be obvious that one model would be chosen to be used for segmentation of the text document.

- Rabiner and Kanevsky are analogous art because both pertain to modeling of speech. It would be obvious to someone of ordinary skill in the art at the time of the invention to combine Rabiner with the Kanevsky device because "In this paper we attempt to carefullyand methodically review the theoretical aspects of this type of statistical modeling and show how they have been applied to selected problems in machine recognition of speech. [Rabiner, Page 1]" Rabiner discloses the statistical approach to how the hidden Markov model is used in Kanevsky.

**As per claim 9, claim 2 is incorporated and Kanevsky fails to teach:**

- **the step of selecting a probability model comprises the step of selecting a probability model by using one of an Akaike's information criterion, a minimum description length criterion, and a Bayes posteriori probability**
- However, Akaike's information criterion is well known in the art for model selection. Since it is obvious to select a model, it would be obvious to someone of ordinary skill to use Akaike's information criterion to select a model to determine the best model for segmentation of the text.

Claims 13 and 20 are rejected under the same principles for being the apparatus claims to the corresponding method claims 2 and 9. Each of the stated corresponding claims have parallel limitations between the method and the device and the hardware

aspect of claims 13 and 20 are taught by [Kanevsky, claims 13-24] which define the apparatus directed to the previous method claims for practicing the invention.

10. Claims 7-8, 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanevsky et al. (US Patent #6104989) in view of NPL document "Bayesian Adaptive Learning of the Parameters of Hidden Markov Model for Speech Recognition" hereinafter Huo.

**As per claim 7, claim 1 is incorporated and Kanevsky fails to teach:**

- **the step of outputting an initial value of a model parameter comprises the step of hypothesizing a distribution using the model parameter as a probability variable, and outputting an initial value of a hyper-parameter defining the distribution**
- **the step of estimating a model parameter comprises the step of estimating a hyper-parameter corresponding to a text document as a processing target on the basis of the output initial value of the hyper-parameter and the text document**

**Huo, in analogous art, teaches the above limitations,**

- **the step of outputting an initial value of a model parameter comprises the step of hypothesizing a distribution using the model parameter as a probability variable, and outputting an initial value of a hyper-parameter defining the distribution**

- [Huo, page 335] discloses "we do not explicitly show the parameters of the prior PDF (often referred to as the hyperparameters) which are assigned values by the investigator." Since the values are assigned, and thus initialized.
- Huo and Kanevsky are analogous art because Huo's paper concerns the training of the HMM model parameters that are used in Kanevsky. It would be obvious to someone of ordinary skill in the art at the time of the invention to combine Huo with the Kanevsky device because Huo provides algorithms that "are shown to be effective especially in the cases in which the training or adaptation data are limited" which would provide an improvement over previous algorithms.

- **the step of estimating a model parameter comprises the step of estimating a hyper-parameter corresponding to a text document as a processing target on the basis of the output initial value of the hyper-parameter and the text document**

- [Huo, page 335] discloses "the important issue of prior density estimation is addressed and an empirical Bayes method to estimate the hyperparameters of prior density based on the moment estimate is proposed." Furthermore, [Huo, 339] teaches that equation 49 is used for updating the hyperparameters. Thus, they are based on the initial value and are estimated.
- Huo and Kanevsky are analogous art because Huo's paper concerns the training of the HMM model parameters that are used in Kanevsky. It would be obvious to someone of ordinary skill in the art at the time of the invention to

combine Huo with the Kanevsky device because Huo provides algorithms that "are shown to be effective especially in the cases in which the training or adaptation data are limited" which would provide an improvement over previous algorithms.

**As per claim 8, claim 7 is incorporated and Kanevsky fails to teach:**

- **the step of estimating a hyper-parameter comprises the step of estimating a hyper-parameter by using Bayes estimation**
- [Huo, page 335] discloses "the important issue of prior density estimation is addressed and an empirical Bayes method to estimate the hyperparameters of prior density based on the moment estimate is proposed." Bayes estimation is used to estimate the parameters.
- Huo and Kanevsky are analogous art because Huo's paper concerns the training of the HMM model parameters that are used in Kanevsky. It would be obvious to someone of ordinary skill in the art at the time of the invention to combine Huo with the Kanevsky device because Huo provides algorithms that "are shown to be effective especially in the cases in which the training or adaptation data are limited" which would provide an improvement over previous algorithms.

Claims 18 and 19 are rejected under the same principles for being the apparatus claims to the corresponding method claims 7 and 8. Each of the stated corresponding

claims have parallel limitations between the method and the device and the hardware aspect of claims 18 and 19 are taught by [Kanevsky, claims 13-24] which define the apparatus directed to the previous method claims for practicing the invention.

***Conclusion***

11. Refer to PTO-892, Notice of References Cited for a listing of analogous art.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREG A. BORSETTI whose telephone number is (571)270-3885. The examiner can normally be reached on Monday - Thursday (8am - 5pm Eastern Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chameli Das can be reached on 571-272-3696. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Greg A. Borsetti/
Examiner, Art Unit 4141

/CHAMELI C. DAS/
Supervisory Patent Examiner, Art Unit 4141